DEPARTMENT OF DEFENSE IN-TRANSIT VISIBILITY MODIFICATIONS

A Monograph

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2013-01

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
	SAMS Monograph	JUNE 2012 – MAY 2013

4. TITLE AND SUBTITLE
DEPARTMENT OF DEFENSE IN-TRANSIT VISIBILITY MODIFICATIONS

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
MAJ Charles L. Montgomery

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army School of Advanced Military Studies
ATTN: ATZL-SWD-GD
Fort Leavenworth, KS 66027

8. PERFORMING ORG REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution is Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT
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Economic growth, global political influence, and expansion of technology translate into a powerful military structure. Procurement operations within the United States do not represent a point of friction; however, the ability to provide real time tracking of supplies throughout the distribution pipeline increases logistical effectiveness within the Joint Operations Area (JOA). This monograph's intent is to frame the environmental problem, identify key executive agencies, examine potential improvements to the existing ITV infrastructure, and recommend changes to improve the overall efficiency of the system.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. PHONE NUMBER** *(include area code)*
(U)	(U)	(U)	(U)	68	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

MONOGRAPH APPROVAL PAGE

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Monograph Title: Department of Defense In-Transit Visibility Modifications

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

DEPARTMENT OF DEFENSE IN-TRANSIT VISIBILITY MODIFICATIONS, by Major Charles L. Montgomery, 49 pages.

Extending operational reach within a Defense Support of Civil Authorities (DSCA) environment demands a comprehensive procurement infrastructure with detailed emphasis on real time cargo, passenger, and equipment tracking. Improvements to the distribution process will lead to fundamental shifts in the ability of logistics professionals to assist ground commanders to develop sustained civil support operations. Logistical operations dictate the execution of military operations, and the loss of lines of communications (LOC) equals eventual operational culmination. Twenty-first century technology allows military organizations the ability to maximize commercial systems in an effort to improve operations. However, the volume of independent information systems makes collaboration and item tracking problematic because of the absence of a central system infrastructure design to unify information collection. Leveraging twenty-first century technology will allow military organizations the ability to provide real time supply in-transit visibility (ITV) during federal emergencies to save lives.

Economic growth, global political influence, and expansion of technology translate into a potentially powerful military structure. Procurement operations within the United States do not represent a point of friction. However, the inability to provide real time tracking of supplies throughout the distribution pipeline highlights the need for system modifications within the Joint Operations Area (JOA). This monograph's intent is to frame the environmental problem, identify key executive agencies, examine potential improvements to the existing ITV infrastructure, and recommend changes to improve the overall efficiency of the system.

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ACRONYMS

ADP	Army Doctrine Publication
ADRP	Army Doctrine Reference Publication
AIS	Automated Information System
AIT	Automatic Identification Technology
AMC	Air Mobility Command
AOR	Area of Responsibility
ARNORTH	U.S. Army North
ASCC	Army Service Component Command
BCS3	Battle Command Sustainment Support System
CAC	U.S. Combined Arms Center
CBRNE	Chemical Biological Radiological Nuclear and High Yield Explosives
CGSC	U.S. Command and General Staff College
CL V	Class Five (Ammunition)
CMOS	Cargo Movement and Operations System
CRS	U.S. Congressional Research Service
CSI	Combat Studies Institute
DCE	Defense Coordinator Element
DHS	U.S. Department of Homeland Security
DLA	U.S. Defense Logistics Agency
DLRO	CGSC Department of Logistics and Resource Operations
DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOS	U.S. Department of State
DPO	Distribution Process Owner

DSCA	Defense Support of Civil Authorities
DTS	Defense Transportation System
EXORD	Executive Order
FEDEX	Federal Express
FEMA	U.S. Federal Emergency Management Agency
FM	U.S. Army Field Manual
GAO	U.S. Government Accountability Office
GATES	Global Air Transportation Execution System
GTN	Global Transportation Network
HD	Homeland Defense
HQ	Army Headquarters
IGC	Integrated Data Environment/Global Transportation Network Convergence
IRRIS	Integrated Response and Recovery Information System
ITV	In-Transit Visibility
JIIM	Joint, Interagency, Intergovernmental, Multinational
JOA	Joint Operations Area
JP	U.S. Joint Publication
LIMS	Logistics Information Management System
LMD	Logistics Management Directorate
LNO	Liaison Officer
LOC	Lines of Communication
LTC	U.S. Army Lieutenant Colonel
LTG	U.S. Army Lieutenant General
MA	Mission Assignment
MAGTF	Marine Air-Ground Task Force

MCTP	Mission Command Training Program
MDSS	MAGTF Deployment Support System
MG	U.S. Army Major General
MSC	Military Sealift Command
MSL	Military Shipping Label
MTT	Mobile Training Team
NBER	National Bureau of Economic Research
NCO	Noncommissioned Officer
NEO	Noncombatant Evacuation Operation
NIMS	National Incident Management System
NLC	National Logistics Coordinator
NORAD	U.S. North American Aerospace Defense Command
NRF	National Response Framework
RF	Radio Frequency
RFA	Request For Assistance
RFID	Radio Frequency Identification
SDDC	Surface Deployment and Distribution Command
SGM	U.S. Army Sergeant Major
SLI	Single Logistics Integrator
TAV	Total Asset Visibility
TC-AIMS	Transportation Automatic Information for Movement Systems
TSC	U.S. Army Theater Sustainment Command
TWI	Training With Industry
UCP	Unified Command Plan
UPS	United Parcel Service

USNORTHCOM	United States Northern Command
USTRANSCOM	United States Transportation Command
WPS	World Wide Port System
WW	World War

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INTRODUCTION

In-transit visibility (ITV) represents one of three components that cumulatively comprise the Department of Defense (DOD) Total Asset Visibility (TAV) infrastructure.[1] The other two components of TAV detail the ability to track cargo in storage and in process prior to entering the distribution pipeline.[2] This monograph will solely focus on ITV, particularly within the context of Defense Support of Civil Authorities (DSCA) as it relates to Title X DOD military forces. The term "*DSCA Environment*", as it relates to this monograph, refers to DOD assets responding to national disasters or emergencies in conjunction with interagency, intergovernmental, and commercial partners pursuant to mission requirements pertaining to homeland defense.

Information is vital to military operations around the world regardless of nationality, and tapping into available information systems allow organizations the ability to enhance operations to achieve greater success. The United States (U.S.) Transportation Command (USTRANSCOM) controls the distribution process within and outside the continental United States.[3] Therefore, from DOD's standpoint the authority to research, develop, implement, and assess ITV systems reside within USTRANSCOM's purview. Army Doctrine Publication (ADP) 4-0 defines ITV as "the ability to track the identity, status, and location of DOD units, non-unit cargo, passengers, patients, and personal property from origin to consignee."[4] The current ITV infrastructure within the DSCA environment is inadequate to respond to large-scale natural or terrorist events within

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[1]Susan Geis, "The Global Transportation Network: The Heart of In-Transit Visibility" (master's thesis, Naval Postgraduate School, 1999), 8.

[2]Ibid., 8-9.

[3]U.S. Transportation Command, (DOD Automatic Identification Technology Concepts of Operations (CONOPS) for Supply and Distribution Operations, June 2007), 1-1.

[4]U.S. Department of the Army, *ADP 4-0 Sustainment* (Washington, DC, Government Printing Office, 2012), Glossary 2.

the United States. The terrorist attacks in 2001 and Hurricane Katrina in 2005 serve as two examples of why the system requires attention to meet emergency response needs. Modifying DOD's current ITV infrastructure with a permanent Army headquarters and military ITV battalion will improve logistical operations within the DSCA environment.

The United States Department of Homeland Security (DHS) serves as the umbrella organization for controlling the response to federal emergencies. DHS's focus is primarily the prevention of terrorist attacks through establishing homeland security mechanisms designed to protect the United States and its sovereign areas. Subsequently, DHS tasked the Federal Emergency Management Agency (FEMA) to serve as the executive agency (EA) for terrorism and natural disaster response within the United States. Establishing this response hierarchy is critical to understand the nature of emergency response within the DSCA environment.[5] The most critical addition to DOD's role within the DSCA environment occurred in 2002 with the creation of the United States Northern Command (USNORTHCOM) located at Peterson Air Force Base, Colorado.

The establishment of USNORTHCOM in 2002 added one additional geographic combatant command (GCC) to the Unified Combatant Command structure. USNORTHCOM controls Title X military responsibilities when approved by the President of the United States during DSCA events. The mission of USNORTHCOM encompasses "planning, organizing, and executing homeland defense and civil support missions. The command's assignment of forces depends on mission requests, as ordered by the President or Secretary of Defense."[6] Ultimately,

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[5]Defense Support of Civil Authorities Handbook, *Tactical Level Commander and Staff Toolkit,* GTA 90-01-020, January 2012, 2-11.

[6]"Defending Our Homeland," United States Northern Command Website, www.northcom.mil (accessed December 12, 2012).

USNORTHCOM holds the responsibility to build, maintain, and control operational forces during DSCA operations within the ten FEMA regions. USNORTHCOM's Army Service Component Command (ASCC) is United States Army North (ARNORTH) located at Fort Sam Houston, Texas. USTRANSCOM located at Scott Air Force Base, Illinois, is the distribution process owner of all DOD supplies. Combined, all three DOD organizations play a vital role in ensuring the current ITV infrastructure affords ground commanders the ability to make informed decisions based on real time supply, equipment, and personnel statuses.

Effective ITV operations are paramount to supporting civil support operations through providing real time movement data to enhance military decision-making. Army Doctrine Reference Publication (ADRP) 3-0 describes operational reach "as the distance and duration across which a unit can successfully employ military capabilities."[7] ADRP 3-0 establishes the significance of extending operational reach to continue military operations in an effort to achieve the desired end state. Sustainment covers all aspects of military operations, and measuring organizational readiness provides commanders an accurate snapshot of their unit's potential to perform operations. Organizational readiness degradation occurs from many sources; however, effective procurement allows organizations to maintain unit readiness over an extended period. This process marks the point where supply ordering and delivery becomes time sensitive to maintain operational reach. ADRP 3-0 articulates how well conceived operational approaches allow commanders and staff the best opportunity to achieve success.[8] ITV data allows leaders the ability to forecast delivery of supplies, track convoy movements, and establish a common logistical operational picture to enhance civil support operations. ITV represents a vital link between certainty and ambiguity in regards to organizations ordering supplies and their

[7]U.S. Department of the Army, *ADP 3-0 Unified Land Operations* (Washington, DC, Government Printing Office, 2011), 4-5.

[8]Ibid., 4-2.

anticipated arrival. The ability to track items provides predictability in equipment readiness, soldier sustainment, and overall accomplishment of strategic goals.

DSCA operations add an additional layer of complexity to the ITV infrastructure. The terrorist attacks on September 11, 2001, exposed key gaps within the United States protection and emergency response infrastructure. Matt Jadacki has served as the Assistant Inspector General for Emergency Management Office of the Inspector General for DHS since 2005. Mr. Jadacki is responsible for preventing problems through compliance measures aimed to increase DHS overall emergency responsiveness. Mr. Jadacki testified before the House Committee on Homeland Security, "as National Logistics Coordinator (NLC), FEMA relies on strong collaboration with other federal agencies, nongovernmental agencies, state and local governments, and the private sector to establish integrated disaster support supply chains." [9] Mr. Jadacki's summary explained the importance of collaboration to achieve the DSCA mission. Establishing unity of command would allow federal, state, and local agencies the ability to accomplish unity of effort within the DSCA response environment. Communication is essential within the Joint Operations Area (JOA), but an integrated communication system within DSCA is necessary to save additional lives. Logistics plays a major role in all theaters; however, providing time sensitive logistics during or after DSCA events represents a large percentage of civil support operations.

Sustainment functions encompass health services, logistics support, and personnel services. Whether the event involves a hurricane, flood, fire, Chemical Biological Radiological Nuclear and High Yield Explosives (CBRNE), or a combination of the four events, the primary focus within the DSCA environment revolves around logistics. Mr. Jadacki asserts within the same report to the House of Representatives, "concerns about other information technology

[9]U.S. Department of Homeland Security, Office of Inspector General, Statement of Matt Jadacki, U.S. Geological Survey (Washington, DC, 2010), 4.

systems need strengthening at FEMA."[10] Mr. Jadacki highlights FEMA's recognition that communication was the single largest challenge during the 2005 hurricane season.

FEMA, as the executive agency, holds the majority of the responsibility to ensure integration occurs between, federal, state, and local levels during crisis response. The lack of communication depicts a key failure during Hurricane Katrina response, when thousands of supplies arrived within the JOA untracked because of the lack of ITV systems collaboration across commercial, governmental, and non-governmental agencies.[11] ITV allows leaders the ability to forecast the arrival of supplies to facilitate informed decisions on mission assignments (MA). In 2006, Representative Bill Shuster (R-PA) advocated, "private sector companies provide the best relief model because they know exactly what's in a truck. They know exactly where it is moving."[12] Representative Shuster points out two critical points that involve availability of private sector technology, and the ability to know where supplies are at any given time during an operation. Private companies are motivated to a higher degree to achieve detailed cargo visibility because the outcome has a direct correlation with financial gain or loss. Initially, supplies arriving to the Hurricane Katrina JOA originated with federal suppliers, commercial agencies, and private donations. However, FEMA and DOD agencies had no idea these actions were occurring which resulted in the loss of accountability of mass amounts of supplies and cargo because of the lack of coordination between the two sectors.[13] Selecting the optimal ITV system represents one aspect of modification; however, the idea is to establish an infrastructure that improves collaboration at

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[10]Ibid., 4.

[11]Ibid., 2.

[12] United States House of Representatives, *A Failure of Initiative*, Investigation of Hurricane Katrina Preparation and Response, by Select Bipartisan Committee, 109th Cong., 2d sess., U.S. Geological Survey (Washington, DC, 2006). 327.

[13]Ibid., 327.

federal, state, and local levels to enhance emergency response operations. Identifying essential modifications to the current ITV infrastructure will enhance DSCA operations; however, to make the system a complete success mandates the cooperation of federal, state, local, and private companies through agreed upon contractual terms to comply with prescribed operating standards.

In recognition of ITV inadequacies, the military must proceed within its purview to enhance ordering and tracking operations. Once individual states' emergency response capabilities culminate, DOD must be ready to respond in an effort to restore impacted regions to desired outcomes prescribed by political leaders. USTRANSCOM proclaims, "DOD has used automatic technology (AIT) as a data capture tool for more than a quarter of a century. DOD has explored use of a wide variety of AIT through prototypes and implementations throughout the Services and Agencies."[14] In 2006, USTRANSCOM assumed the role as the distribution process owner for DOD. Information technology tunnel vision will only detract from the United States' ability to support operations that assist American citizens during natural disasters or terrorist events. USTRANSCOM's acquisition of technology must consider the entire supply chain system to improve overall efficiency of the National Response Framework (NRF). The crux of the matter revolves around numerous entities involved on a grand scale within the United States. The probability of establishing one overarching system is slim based on mission classifications, but creating an ITV network specifically designed to allow collaboration between commercial and governmental agencies within the United States is feasible.

The NRF represents the response framework for federal, state, local, and private organization actions during an emergency.[15] The first attempt to establish collaboration within the

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[14]"Defending Our Homeland," United States Northern Command Website, www.northcom.mil (accessed December 7, 2102).

[15]U.S. Federal Emergency Management Agency, National Response Framework, by Department of Homeland Security, U.S. Geological Survey (Washington, DC, 2008), 3.

DSCA environment involves creating a common operational picture (COP) for all participants supporting emergency operations. The NRF defines national strategy as it pertains to emergency response within the DSCA environment. The common language expressed in this document serves as an initial point of reference when agencies have questions or concerns in regards to FEMA principles, and it allows all participants to speak one common language to alleviate confusion during the most critical hours of response. The second critical aspect concerning the NRF is in regards to its ability to collaborate with the National Incident Management System (NIMS). NIMS enhance emergency operations through increased collaboration effectiveness among responders to sustain American lives and prevent further damage.[16] The NRF takes a macro view of DSCA operations, while NIMS takes a micro view of the establishment of principles that allows each organization the ability to synchronize their efforts in a meaningful manner. FEMA is not the team, but part of a team. That team includes federal, state, tribal, local officials, private sector, non-profit, and faith-based groups.[17] As the executive agency for emergency homeland response, FEMA has the monumental task of establishing collaborative systems across all levels of government and private businesses to provide the most effective response during emergencies. ITV represents one of the most critical aspects within emergency operations in an attempt to gain TAV in the JOA.[18]

The current ITV infrastructure is inadequate in shipment tracking and end user receipt predictability. The infrastructure lacks collaboration across federal, state, and local levels to gain supply accountability throughout the procurement process. Establishing an organization

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[16]"National Incident Management System", Federal Emergency Management Agency, FEMA-NIMS@fema.dhs.gov. (accessed December 6, 2012).

[17]U.S. Federal Emergency Management Agency, National Response Framework, by Department of Homeland Security, U.S. Geological Survey (Washington, DC, 2008), 5.

[18]Susan Geis, "The Global Transportation Network: The Heart of In-Transit Visibility" (master's thesis, Naval Postgraduate School, 1999), 8.

responsible for DSCA ITV will enhance military logistics operations. Analysis of the ITV infrastructure prior to the World Trade Center attacks, and the events surrounding the aftermath of Hurricane Katrina demonstrates inadequacies of the current infrastructure. The current economic state will dictate military budget decreases; however, enhancing programs already in existence provides viable options to solve the current ITV problem.

The U.S. Army program "Training With Industry (TWI)," which sends officers to commercial organizations such as Federal Express to learn their organization's systems, will play an integral role in modifying the current ITV infrastructure.[19] Expanding TWI officer responsibility to include a liaison role with operational units will increase the effectiveness of ITV operations. Accurately forecasting the arrival of supplies will enhance supported organizations ability to build, sustain, and maintain a distinct level of organizational readiness to support DSCA operations.

[19]Marshall Ramsey, "Training with Industry," Army Sustainment, http://www.almc.army.mil/alog/issues/May-June10/train_windustry.html (accessed December 6, 2012).

LITERATURE REVIEW

Military theorists from medieval through modern times emphasize the magnitude of a responsive logistical system. Sun Bin was a military philosopher during the Chinese Warring States Period (403 BCE-221 BCE) and he argued, "the line between disorder and order lies in logistics."[20] ITV represent the line between order and disorder. The implementation of ITV eliminates nebulous supply distribution approaches because it continuously increases organization's supply location awareness while simultaneously providing additional options to make informed decisions. The strategic, operational, and tactical importance of effective logistics operations plays an enormous role in the outcome of war.

Martin Van Creveld is an Israeli military historian who has written seventeen books expounding on the nature of military strategy. He provides a great starting point to link the question of how to improve ITV within military organizations. Van Creveld's S*upplying War, Logistics from Wallenstein to Patton*, provides a detailed synopsis of logistic procurement and synchronization. The three dominant supply systems during this timeframe were living off the country, establishing commercial requisition systems, and establishing lines of communications.[21] The system of living off the country depended upon three criterion: the number of soldiers, the number of local inhabitants, and the amount of food produced. Therefore, increased numbers of soldiers and local inhabitants placed an enormous strain on crops and live stock during war. Logically, armies implemented requisition and the establishment of lines of communications (LOC) from their homeland. The implementation of requisitions and LOCs highlights multiple

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[20]Lau, D.C. and Ames, Roger T. *Sun Bin: The Art of Warfare: a Translation of the Classic Chinese Work of Philosophy and Strategy*. Albany: State University of New York Press, 2003. `

[21]Martin van Creveld, *Supplying War: Logistics from Wallenstein to Patton* (New York, New York: Cambridge University Press, 1979), 2-21.

supply distribution pipelines that could cover 3,000 to 6,000 kilometers. The knowledge that supplies depart from specific locations is part of critical supply information exchange; however, the ability to track supplies from origin to destination constitutes the enabling effect ITV has on military operations leading to better informed decision making.

The Napoleonic Wars (1803-1815) highlighted the ability of French armies to order, ship, and to some degree track supplies to formations. However, within this context, Emperor Napoleon controlled the strategic, operational, and tactical logistical levels based on his position as head of state. The ability to control a state's economic system allows free access and employability of national resources. The employability of national resources is critical, and this link serves as one of the key gaps in the capability to modify the current logistical infrastructure. Van Creveld expressed, "the one field of Napoleonic warfare that is still believed to have been fundamentally different from anything that went previously is the logistics one, which is itself enough to suggest that the subject has been neglected."[22] Napoleon added a second logistical apparatus that was unprecedented during his period, which mirrors current logistical depots and supply hubs. The idea was to position enormous amounts of supplies forward using water vessels and land transport to increase the ability to support army operations. Intellectually, Napoleon understood that lack of supply knowledge would lead to disorder as described by Sun Bin. The establishment of depots allowed Napoleon to gain additional supply clarity, and shipping items from depots to front lines increased supply tracking based on shorter distances. Napoleon placed enormous emphasis on logistics, and increased supply ITV enabled him to achieve military success based on extended operational reach.

The Franco-Prussian War (1870-1871) highlighted the significance of the advancement of technology and its effect on military operations. Helmuth von Moltke the elder, Prussian Army

[22]Ibid., 2.

Chief of Staff, displayed the ability to employ technological advancements in combat operations, which yielded positive results. Identified shortcomings in the supply system discovered by the 1870 campaign were not, admittedly, due to the lack of organization.[23] The overwhelming logistical success experienced by the Prussians depended on the access and implementation of the railroad network. The railroad network progression over a period of fifty years allowed Von Moltke to employ a capability that would affect the outcome of the war. Infrastructure and technology are vital aspects to ITV operations because they increase the ability to track supplies, decrease customer wait time, and enhance predictability. Helmuth von Moltke's desire to implement new technologies into combat operations improved Prussia's supply ITV and their opportunity to achieve greater success on the field of battle.

The American Civil War started in 1861 and ended in 1865. The Vicksburg Campaign highlights the employment of available technology, and the use of joint forces to extend operational reach throughout the South. The two armies in contention were Major General (MG) Ulysses S. Grant's Union Army of Tennessee and Lieutenant General (LTG) John C. Pemberton's Confederate Army in Vicksburg, Mississippi. The Fort Leavenworth Combat Studies Institute (CSI) research on Vicksburg suggests, "the Mississippi River was not a barrier to the Union ground forces involved in the Vicksburg campaign; rather, it was a superhighway. The free movement by river of both men and material was an essential precondition for Grant's campaign against Vicksburg." [24] MG Grant's understanding of key logistical thoroughfares resembles Helmuth von Moltke's desire to use the railroad network to increase ITV and predictability of supply arrival. The Mississippi River allowed supplies for MG Grant's Army of Tennessee to be loaded north of Vicksburg with a single line of advance to their location. MG

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[23]Ibid., 97.

[24]Christopher Gabel Dr., *Staff Ride Handbook for the Vicksburg Campaign, December 1862 July 1863* (Fort Leavenworth, Kansas: Combat Studies Institute, 2001), 13.

Grant's supply ITV increased with the use of the river based on a single directional path and decreased travel distance. MG Grant's logistical theory derived from the usage of all available sources to increase supply ITV in an effort to extend the Army of Tennessee's operational reach.

The United States entry into World War I (1914-1918) during the year of 1917, highlights the significance of viable economy and its symbiotic relationship with a military's ability to provide critical logistical efforts to sustain operations. The American economy played an enormous role during World War I, and a majority of Americans supported the war effort in some fashion. The National Bureau of Economic Research (NBER) describes how the surge in federal spending produced a rapid and massive shift in American production from civilian to military goods.[25] The NBER highlights an important shift in how the American economy systematically transformed to meet the requirements of World War I. Assimilating this data is critical to the scope of this monograph, and the idea of massive economic transformation enhances the military's ability to continuously modify ITV operations in an effort to extend operational reach. The target is to create a collaborative infrastructure that allows federal, state, and local governments the opportunity to achieve unity of effort during a national crisis prior to a catastrophic event. ITV advancements symbiotic relationship with the economy provides mutual benefits to the army and protection of the United States of America.

World War II logistics played a vital role during large-scale operations, and it determined the ability to engage the enemy in the Pacific and European theaters. Carlo D' Este, an American military historian, stated, "the shortage of artillery ammunition had led to something like a

[25]Hugh Rockoff, "Until It's Over, Over There: The U.S. Economy in World War I" (NBER WORKING PAPER SERIES, 1050 Massachusetts Avenue Cambridge, MA 02138, June 2004), 6.

stalemate around Caen which hindered reinforcement operations."[26] The ability to track the precise location of the resupply of ammunition would have allowed Field Marshal Montgomery (Allied 21st Army Group Commander) to establish a defense or operational pause to receive the supplies to exploit the enemy. Operation Bagration in 1944 was an operation executed by the Soviets during World War II in which they attacked the German Center Army to liberate Belorussia.[27] In achieving success, the Soviet pursuit continued placing great demands on their logistical capabilities. This phase of the war depended upon the Soviet logistical infrastructure, and the capability to resupply their force determined offensive distances required to apply pressure on Axis forces.[28]

President Franklin D. Roosevelt understood the importance of procurement, and he established mechanisms to address military operational requirements. "The Supply Priorities and Allocations Board recognized early that efficiency lay in establishing an allocation system versus spending time on priorities. Trying to establish priorities corrupted the system when everybody wanted everything now and certainly ahead of everybody else."[29] The links between the United States economy and war efforts are vital to success. The nation's efforts played a key role in obtaining success. The United States vastly out-produced its allies and enemies, peaking around 1943.[30] The foundation of a great army depends on the support of its nation, economic capabilities, and the ability to establish supply priorities to support war operations. The support of

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[26]Carlo D'Este, *Decision in Normandy* (New York, New York: E.P. Dutton Inc, 1983), 225.

[27]David M. Glantz and Jonathan M. House, *When Titans Clashed: How the Red Army Stopped Hitler (Modern War Studies)* (Lawrence: University Press of Kansas, 1998), 195.

[28]Ibid., 221.

[29]Alan. (ed). Gropman, *The Big 'l': American Logistics in World War II*, ed. Alan Gropman (Washington, DC: U.S. G.P.O., Supt. of Docs, 1997), 29.

[30]Ibid., 2.

the nation transforms into procuring technology to modify current ITV systems to enhance military operations within the DSCA environment.

The terrorist attacks on September 11, 2001 changed America in many ways. The attacks highlighted the difference between symmetrical and asymmetrical warfare, and the idea that security must be a priority that includes the American homeland. FEMA serves as the executive agency responsible for emergency response operations. The creation of FEMA occurred in 1979, and the organization fell under the purview of DHS command structure in 2003.[31] The United States created the Department of Homeland Security in 2002 through Public Law 107-296.[32] The establishment of DHS was a response to asymmetric threats, in particular the attacks on September 11, 2001. DHS's mission is to provide security and protection from internal and external threats. This mission requires the employment of over 240,000 people with responsibilities that range from border security, chemical facility inspectors, emergency response, and cyber security.[33] DHS represents the overall structure of the internal organization identified to protect America's homeland.

FEMA's primary responsibility entails establishing the infrastructure that facilitates planning and response to disasters within the United States. FEMA divides the United States and its territories into ten regions, and the responsibility of planning belongs to regional leaders in their specific area of operations. DOD Directive 3025 sets forth policy guidance for the execution and oversight of DSCA when requested by civil authorities and approved by the appropriate DOD

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[31]Defense Support of Civil Authorities Handbook, *Tactical Level Commander and Staff Toolkit,* GTA 90-01-020, January 2012, 2-11.

[32]Department of Homeland Security, *Public Law 107-296,* U.S. Statutes at Large 116 (2002): 2142, codified at U.S. Code 6 (2002), § 111.

[33]"Department of Homeland Security," Department of Homeland Security, http://www.dhs.gov/ (accessed December 8, 2012).

authority, or as directed by the President of the United States.[34] The area of responsibility includes the District of Columbia, Commonwealth of Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, Commonwealth of the Northern Mariana Islands, and any territory or possession of the United States or any political subdivision thereof.[35]

The military's ability to execute DSCA operations requires additional planning and resource allocation to increase effectiveness. The military is accustomed to executing missions external to the United States; however, asymmetric threats force the organization to plan for potential support within the United States. The 2001 Quadrennial Defense Review (QDR) stated, "to ensure the department transforms its logistics capabilities, DOD will pursue actions to sustain the force more effectively and efficiently."[36] This establishes strategic guidance necessary to pursue ITV modifications that enables DOD to perform and execute missions to a higher standard. Ideally, operating in the United States presents an optimal operational environment based on unrestricted access to large volumes of resources. However, the lack of collaborative ITV systems across federal, state, and local levels decreases unity of effort during DSCA related events.

Hurricane Katrina highlighted the deficiency of ITV collaboration within federal, state, and local levels. The hurricane came ashore in August 2005 along the southern coastal region of the United States, and caused widespread devastation along the central Gulf Coast to include New

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[34]Department of Defense Directive (DODD) 3025. Defense Support of Civil Authorities. 29 December 2010.

[35]Ibid., 1.

[36]U.S. Department of Defense, Quadrennial Defense Review, U.S. Geological Survey (Washington, DC, 2001), 35.

Orleans, Louisiana; Mobile, Alabama; and Gulfport, Mississippi.[37] DHS presented a formal assessment to the House Committee on Homeland Security on September 29, 2010. FEMA's performance review identified the lack of an asset ordering process, inexperienced and untrained personnel, unreliable communications, and insufficient internal management controls.[38] The absence of unity of command across all organizations is the consistent thread that links historical failures to response efforts. DSCA operations by design are inherently joint operations, and achieving unity of effort through the creation of a single ITV infrastructure that allows collaboration across all levels is a means to success.

DOD has made progress in addressing supply distribution problems; however, the department lacks the ability to make coordinated and systematic improvements that pertains to multiple organizations. The root cause of DOD's inability to coordinate and implement improvements concerns the subject of accountability and authority.[39] The Government Accountability Office (GAO) captures the essence of the problem, which is the lack of a unified process among federal, state, local, and commercial partners. Development of ITV collaborative systems within the DSCA environment is essential, and the key component to change involves USNORTHCOM. Congressional Orders Code RS21322 mandated the establishment of USNORTHCOM as a DOD Geographic Combatant Command responsible for the United States, Alaska, Canada, Mexico, Gulf of Mexico, Puerto Rico, U.S. Virgin Islands, and the surrounding waters out to 500 nautical miles. USNORTHCOM's primary mission is to defend the United

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[37]"Hurricane Katrina National Oceanic and Atmospheric Administration", National Climate Data Center, http:www.ncdc.noaa.gov (accessed December 8, 2012).

[38]U.S. Department of Homeland Security, Office of Inspector General, Statement of Matt Jadacki, U.S. Geological Survey (Washington, DC, 2010), 4.

[39]United States Government Accountability Office, Defense Logistics, U.S. Geological Survey (Washington, DC, 2005), 1.

States from internal and external threats. This takes the form of deterrence, prevention, and defeating threats and aggressions designed to harm inhabitants of the United States.[40]

USNORTHCOM has the responsibility to assist FEMA during emergency response operations as DOD's lead organization. USNORTHCOM responded to Hurricane Katrina, marking the organizations first major response to a natural disaster. USNORTHCOM exhibited initiative to gain valuable information through prepositioning command liaison cells in Baton Rouge, Louisiana; Clanton, Alabama; and Jackson, Mississippi. The Defense Coordinator Elements (DCE) allowed USNORTHCOM the ability to monitor federal, state, and local requirements in an effort to dispatch the correct response force. However, USNORTHCOM's ability to coordinate logistical efforts throughout the JOA suffered from the lack of a single ITV infrastructure. One of the final reports from the U.S. House of Representatives Select Bipartisan Committee validates this assertion. The committee revealed, "the technology used to manage FEMA's logistics system may be partly to blame. FEMA's Logistics Information Management System III (LIMS III) is used to manage the agency's inventory of equipment and supplies."[41]

The current DOD doctrine that addresses humanitarian assistance is Joint Publication (JP) 3-27 *Homeland Defense* (HD), and it established DOD's joint roles and responsibilities in support of defending the homeland. The key phrase is *in support of*, and support agencies may include DHS, Department of Justice (DOJ), or other governmental agencies approved by the president. JP 3-27 states, "HD operations may be conducted in a complex environment characterized by numerous and varied threats, multiple jurisdictions, nontraditional partners, nongovernmental

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[40]U.S. Library of Congress, Congressional Research Service, Homeland Security: Establishment and Implementation of the United States Northern Command, by Steve Bowman and Scott Shepherd, U.S. Geological Survey, serial RS21322 (Washington, DC, 2005), CRS.

[41]United States House of Representatives, *A Failure of Initiative*, Investigation of Hurricane Katrina Preparation and Response, by Select Bipartisan Committee, 109th Cong., 2d sess., U.S. Geological Survey (Washington, DC, 2006). 327.

organizations, and international partnerships."[42] Collaboration and coordination are two elements that must remain a top priority within DOD to accomplish this mission.

Field Manual (FM) 3-28 established the Department of the Army's Civil Support Operations requirements. The designated ASCC for civil support within USNORTHCOM's Area of Responsibility (AOR) is ARNORTH.[43] ARNORTH is responsible for Title X responsibilities to USNORTHCOM. The publication also defined the "principal logistics function of the military during disaster response is to move, maintain, and secure logistical capabilities necessary for the response effort."[44] FM 3-28 highlights essential roles, responsibilities, and execution mechanisms required of the logistics war fighting function as it pertains to support within the DSCA environment. ARNORTH Title X responsibilities include procuring ITV systems that allow collaboration across DOD, state, local, and other governmental agencies involved with emergency response. ARNORTH's primary function includes procurement; however, tracking supplies from origin to destination represents their final function to increase the effectiveness of emergency response operations. Modifying the current ITV infrastructure fulfills the requirements of FM 3-28, JP 3-27, and USNORTHCOM's federal mandate as DOD's executive agency to improve DSCA operational readiness. DSCA operations are time sensitive; therefore, providing accurate real time ITV information on all supplies entering the JOA is necessary to support the nation.

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[42]U.S. Department of Defense, *JP 3-27 Homeland Defense* (Washington, DC: Government Printing Office. July 2007), I2.

[43]U.S. Department of the Army, *FM 3-28 Civil Support Operations* (Washington, DC: Government Printing Office. August 2010), 8-6.

[44]Ibid., 8-1.

FEDERAL EMERGENCY MANAGEMENT AGENCY

The terrorist attacks in 2001 created an enormous sense of urgency to increase the U.S. defense posture in an effort to deter future attacks. The Department of Homeland Security's establishment on March 1, 2003 created a federal agency designed to address protection and emergency response within the United States.[45] FEMA's three emergency response pillars are to save human lives, mitigate human suffering, and to prevent further damage to property.[46] Logistics encompasses the execution of all three emergency response pillars, and FEMA's response effectiveness depends on how logistics integration occurs during emergency responses. The organizational chart in Figure 1 portrays all DHS departments and responsibilities, which integrates over twenty-two different federal departments and agencies under a single command structure.[47] The department that pertains to this monograph is FEMA, and President Jimmy Carter's Executive Order 12127 on March 31, 1979 officially created the organization.

[45]"Organizational Chart", Department of Homeland Security, http://www.dhs.gov/ (accessed December 8, 2012), 1.

[46]"FEMA Three Pillars", Federal Emergency Management Agency, http://www.fema.gov/ (accessed December 8, 2012).

[47]Ibid., 1.

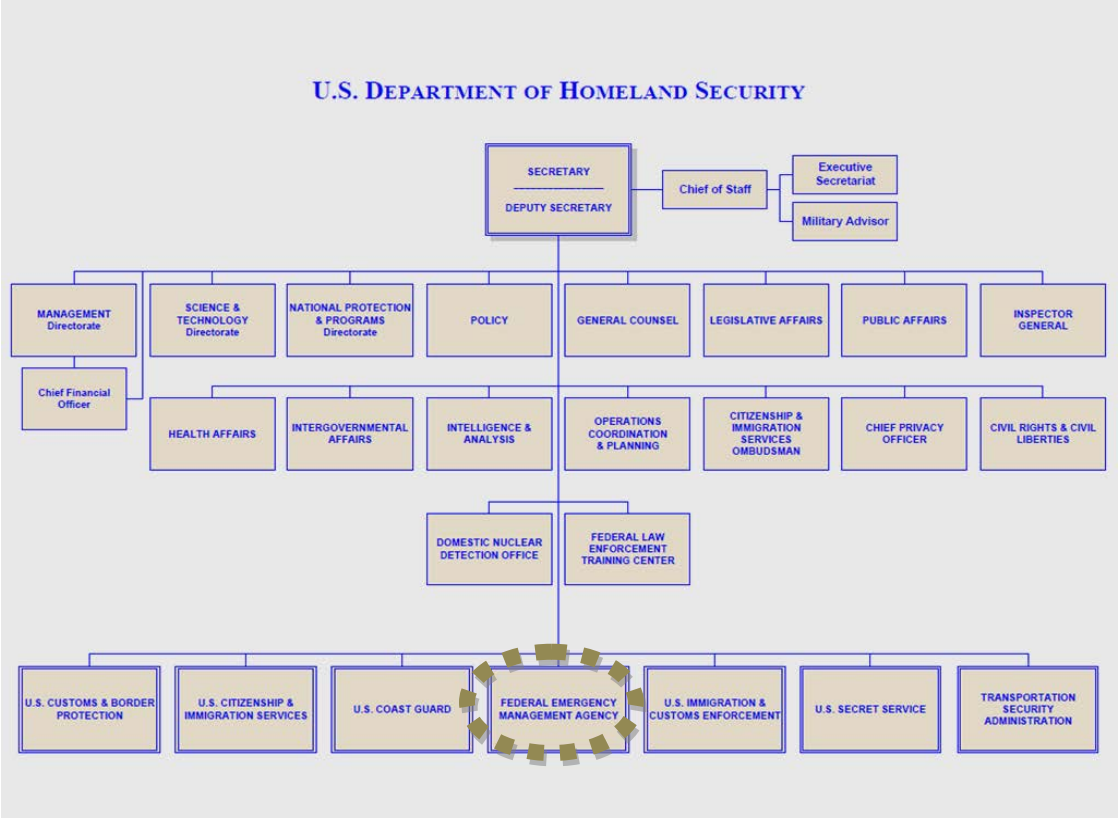

Figure 1: Department of Homeland Security Organizational Chart.

Source: DHS Web Site: http://www.dhs.gov/.

Executive Order 12127 stated, "Reorganization Plan Number 3 of 1978 (43 FR 41943), which established the Federal Emergency Management Agency, provides for the transfer of functions, and the transfer and abolition of agencies and offices, is hereby effective."[48] The Department of Homeland Security identified FEMA as its executive agency to disaster response, which places command and control of emergency response operations within FEMA's responsibility. FEMA's mission "is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect

[48]U.S. Executive Office, Executive Order 12127 Federal Emergency Management Agency, U.S. Geological Survey, pt. 3, serial 43 FR 41943 (Washington, DC, 1979).

against, respond to, recover from, and mitigate all hazards."[49] FEMA has the responsibility to establish an ITV infrastructure that allows collaboration from all participants based on their role as the lead executive agency for emergency response. The National Response Framework established general guidelines for emergency response. However, the NRF alone does not address emergency response efforts holistically to the detriment of Americans in need of emergency response after catastrophic events.

FEMA's attempt to centralize logistics efforts unfolded with its establishment of the Logistics Management Directorate (LMD). LMD's mission is to "effectively plan, manage and sustain national logistics response and recovery operations, in support of domestic emergencies, and special events."[50] Therefore, modifying the current ITV infrastructure begins with DHS and ends with FEMA's LMD. LMD is responsible for coordination, collaboration, and operational approach development to emergency response missions. LMD must take into consideration the differences between federal, state, local, and commercial agencies to provide effective support. Deliberate planning and judicious decision-making will allow multiple agencies to achieve synergy during responses. DOD's role as the lead federal agency must align with FEMA's strategic and operational goals. The DSCA Handbook established that DOD provides emergency response support when requested by civil authorities and approved by the Secretary of Defense.[51] Hurricane Katrina highlighted the significance of DOD's assets and capabilities to assist emergency responses. The 109th Congressional Committee on Homeland Security Affairs

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[49]"Federal Emergency Management Agency", http://www.fema.gov/ (accessed December 8, 2012).

[50]U.S. Department of Homeland Security, Office of Inspector General, Statement of Matt Jadacki, U.S. Geological Survey (Washington, DC, 2010), 2.

[51]Defense Support of Civil Authorities Handbook, *Tactical Level Commander and Staff Toolkit*, GTA 90-01-020, January 2012, 3-3.

conducted a special report entitled "Hurricane Katrina, *A Nation Still Unprepared*."This report describes how FEMA contacted the DOD with the intent of relinquishing logistical operations to military in Louisiana and Mississippi, thus proposing the transfer of one of its most important functions.[52] The preponderance of military capabilities makes this proposal a viable option within DSCA operations, and this decision would resolve logistics failures encountered during Hurricane Katrina.

FEMA's role as the National Logistics Coordinator (NLC) mandates the organization assume the lead role in developing an ITV infrastructure that allows collaboration and information sharing. FEMA's approach to a shared information system must align with legal parameters, and create an environment that allows government and private commercial organizations the ability to merge data without compromising the mission. Regionally, FEMA coordinates with specific organizations to achieve segments of the emergency response mission. Matt Jadacki's statement to the House Committee on Homeland Security proclaimed, "in 2005 FEMA began implementing the TAV program, which was designed to provide asset and ITV as well as electronic order management for all primary commodities."[53] Instituting TAV is a great step in the right direction, but FEMA has to take a serious look at the logistical capabilities of DOD forces. The capabilities that DOD brings to the mission fit precisely into situations that follow natural disasters or terrorist attacks. DOD's logistics distribution by way of land, air, and sea domains offers DSCA emergency responders a plethora of options to support relief efforts. Secondly, DOD's ability to conduct search and recovery operations, displaced civilians transport,

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[52]*Hurricane Katrina: A Nation Still Unprepared*: Special Report of the Committee On Homeland Security and Governmental Affairs, United States Senate, Together with Additional Views. (Washington: United States Senate, 2007), 377.

[53]U.S. Department of Homeland Security, Office of Inspector General, Statement of Matt Jadacki, U.S. Geological Survey (Washington, DC, 2010), 5.

emergency services restoration, and medical evacuation operations surpasses civilian agencies capabilities. Therefore, FEMA should cede control of the logistics system to DOD. USTRANSCOM at this point becomes the primary agency, because USTRANSCOM controls DOD's distribution process. This decision creates a direct relationship with FEMA and USTRANSCOM to create an ITV system that meets DOD, interagency, and commercial organizations needs to enhance emergency response.

FEMA's initial logistical response plans details tapping into stored supplies located at regional warehouses. FEMA's initial response measure is viable, but the goal is to establish a system that allows continued logistical support over an extended period. Establishing a distribution system that allows near real time ITV from origin to destination becomes the number one priority. Currently, most agencies incorporate their preferred informational system that prohibits other systems from establishing effective communication. DSCA operations represent joint operations in execution, and FEMA as the executive agency must provide participants the common operational framework to achieve synergy while providing emergency response support.

Joint planning is an adaptive process that requires adaptive leaders capable of making decisions that reflect the current operational environment. Joint planning transpires in a networked, collaborative environment, which necessitate dialogue among all leaders, concurrent and parallel plan development, and collaboration across multiple planning levels.[54] Clear strategic guidance and frequent interaction between senior leaders and planners promote an early-shared understanding. This facilitates responsive plan development resulting in continuously updated operational plans.[55] Joint Publications are strictly documents for military organizations, but the

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[54]U.S. Department of Defense, *JP 5-0 Joint Operation Planning* (Washington, DC: Government Printing Office, August 2011), XI.

[55]Ibid., II-1.

content highlights essential topics that pertain to any organization within the DSCA environment attempting to achieve success. JP 5-0 highlights the need to have an adaptive process that allows effective dialogue vertically with higher commands and horizontally with parallel planning organizations. Collaboration between DSCA partners needs to occur routinely. USNORTHCOM conducts annual exercises that provide focus on merging operations within DOD, FEMA, and interagency organizations executing DSCA missions. FEMA conducted an evaluation of their logistical branch, and found only modest progress since 2001. The DHS Inspector General in 2008 stressed, "the disasters of 2004 and 2005 highlighted FEMA's lack of standardized policies and procedures, as well as inconsistencies stemming from multiple, independent computer and paper based systems."[56]

The DHS Inspector General identified the absence of a standardized system within the DSCA environment that allowed continuous tracking of supplies. Hurricane Ivan affected Alabama, Louisiana, and Florida in 2004. Hurricane Ivan caused substantial damage and approximately ninety casualties received treatment for various injuries. Hurricane Katrina caused 1833 deaths and over $108 billion dollars in infrastructure damage.[57] Supplies entered the JOA without clear intent and purpose; thus creating an enormous over flow which overwhelmed FEMA's distribution system. Supplies needed in Louisiana, Mississippi, and Alabama were mostly in the area but due to the lack of coordination and accountability, civilians suffered longer than necessary.

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[56]U.S. Department of Homeland Security, Office of Inspector General, FEMA's Preparedness for the Next Catastrophic Disaster, U.S. Geological Survey, pt. OIG-08-34 (Washington, DC, 2008), 25.

[57]"Hurricane Katrina National Oceanic and Atmospheric Administration", National Climate Data Center, http:www.ncdc.noaa.gov (accessed December 8, 2012). 1.

Joint Publication 5-0 mandates organizations develop a shared understanding prior to mission execution to increase the opportunity of achieving mission objectives. Continuous ITV service within the JOA, permit FEMA to track and account for all logistical supplies in an effort to deliver material to the proper area in a timely manner. Establishing a single ITV system that encourages DOD, commercial businesses, interagency and nonprofit organizations utilization during DSCA related events is necessary to develop a common operational picture. This common operational picture will allow leaders the opportunity to make informed decisions during emergency responses. The DHS Inspector General emphasized there were multiple independent systems operating in a vacuum that failed to provide FEMA, DOD, and political officials one logistical picture to accomplish the mission in a more effective manner.[58] Commercially, contractual obligations will ensure all private organizations adhere to established ITV FEMA policies and regulations. USNORTHCOM's role as the lead DOD agency will ensure that ARNORTH, Joint Task Force Civil Support, and Joint Task Force 51 comply with ITV regulations in the endeavor to achieve unity of effort from all participants within the DSCA operating environment. FEMA's failure to create a single ITV infrastructure highlights the organization's primary challenge to providing effective disaster response. This failure incorporates federal and commercial partners' incompatible information systems when providing logistical support during emergency response operations. Unity of command starts with FEMA. FEMA must ensure all participants can effectively collaborate to gain a shared understanding of disaster response objectives. Establishing a single ITV system will allow leaders to track supplies and personnel moving to disaster locations. This data will create an informed decision making process that will ultimately benefit civilians requiring emergency assistance.

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[58]U.S. Department of Homeland Security, Office of Inspector General, FEMA's Preparedness for the Next Catastrophic Disaster, U.S. Geological Survey, pt. OIG-08-34 (Washington, DC, 2008), 30-41.

UNITED STATES NORTHERN COMMAND

The 2002 Unified Command Plan (UCP) formed the United States Northern Command October 1, 2002, to command and control DOD forces responding to DSCA emergency response missions.[59] USNORTHCOM's foundational mission involves centralizing DOD response efforts across ten FEMA regions to assist state and local levels during emergency responses. Prior to the establishment of USNORTHCOM, decentralized mission execution produced inadequate results, which encouraged the federal government to establish a centralized organization focused on synchronizing DOD relief efforts. Unifying DOD's military functions under a single umbrella allows greater command, control, and execution. USNORTHCOM's mission is to "conduct homeland defense, civil support and security cooperation to defend and secure the United States and its interests."[60] USNORTHCOM executes DSCA missions through eight subordinate agencies: Joint Force Headquarters National Capital Region, Joint Task Force Alaska, Joint Task Force Civil Support, Joint Task Force North, Army North, Air Force North, U.S. Fleet Forces Command, and U.S. Marine Forces Northern Command.[61]

USNORTHCOM understands the need for a unified ITV infrastructure that allows collaboration; however, USTRANSCOM controls the movement of supplies, which represents the foundation of the process. Brigadier General (BG) Matthew Dzialo served as the J4 Director

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[59]U.S. Department of Defense, Unified Command Plan, U.S. Geological Survey, pt. MCM 0016-03 (Washington, DC, 2002), 1. "FEMA" Federal Emergency Management Agency, http://www.fema.gov/ (accessed December 8, 2012).

[60]"Defending Our Homeland", United States Northern Command, http://www.northcom.mil/ (accessed December 8, 2012).

[61]"Defending Our Homeland", United States Northern Command, http://www.northcom.mil/(accessed December 5, 2012).

of Logistics and Engineering at USNORTHCOM from September 2010 to October 2012. BG Dzialo's memorandum to the Joint Staff J4 articulated, "North American Aerospace Defense Command (NORAD) and USNORTHCOM require reliable and responsive ITV for movements of personnel and cargo in support of all command exercises, planned operations, and no-notice contingency operations."[62] Current doctrine, policy, and automated systems do not support NORAD and USNORTHCOM requirements to provide reliable and responsive ITV for identified supply movements. BG Dzialo identified key gaps concerning the distribution pipeline, which created negative second, and third order affects during the delivery of supplies within the JOA. The primary identified gap concerns commercial and military ground movements, which represents the majority of supply distribution in DSCA environments. The complexity of the DSCA environment combined with catastrophic disasters offers a clear interpretation of the need to improve DOD ITV operations.

USNORTHCOM's ITV dilemma concerns the lack of a centralized ITV infrastructure that allows collaboration across all services and civilian agencies to gain total supply visibility within the JOA. Establishing a common operating system is the first approach to modifying the current ITV infrastructure. During the last fifteen years, DOD has increased reliance on the commercial sector for specific or multiple supply chain functions. The production capacity of vendors is a major method of increasing the value, velocity, and efficiency of distribution support.[63] Leveraging commercial capabilities within the DSCA environment is the logical approach to timely emergency response. The division between FEMA and DOD illustrates the

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[62]U.S. Department of Defense, North American Aerospace Defense Command and United States Northern Command, Requirements Document for Improved In-Transit Visibility (ITV) of CONUS Ground Movements, by BG Matthew J. Dzialo, U.S. Geological Survey (Washington, DC, 2011), 1-5.

[63]U.S. Department of Defense, *JP 4-09 Distribution Operations* (Washington, DC: Government Printing Office. February 2010), XIV.

lack of visibility in regards to RFA execution, and the division among DOD service components highlights DOD's lack of complete data sharing. Additionally, adding the commercial aspect to the distribution process further increases the complexity of providing a common operational picture during DSCA related events.

The Congressional Committee on Homeland Security and Governmental Affairs conducted a special study on logistical operations in 2006. Commercial vendors such as Wal-Mart responded with enormous distribution capabilities to Hurricane Katrina. Consequently, Wal-Mart's response did not conform to the supply infrastructure established by FEMA, and the results were unproductive leading to unused supply stockpiles. Modifying the current ITV infrastructure to allow collaboration between DOD, commercial, state, local, and FEMA agencies is an absolute necessity to increase response effectiveness. DOD appears to have identified certain areas of FEMA's logistics system that required immediate attention: sourcing, tracking, and transportation.[64] Based on clear failures of FEMA's logistics system, the agency must identify and implement a logistics infrastructure that promotes collaboration to deter future failures during emergency response.

The Department of the Army G4 issued ALARACT 255/2007 and the commander's intent specified that units must provide visibility from material origin until receipt of cargo or equipment by unit/activity. Deploying units and originating activities shipping to the Army, to include agencies and vendors, are responsible for creating Radio Frequency Identification (RFID) tags. RFID tag placement on organizational equipment, cargo, and shipments allows point-to-

[64]*Hurricane Katrina: A Nation Still Unprepared*: Special Report of the Committee On Homeland Security and Governmental Affairs, United States Senate, Together with Additional Views. (Washington: United States Senate, 2007), 378.

point tracking of the equipment.[65] The G4 referenced deploying units primarily, but the guidance applies to DSCA operations as well. The G4 defined the guidance for Army forces; however, the guidance needs to align with FEMA's LMD strategic operational goals. Additional guidance relating to DSCA operations would enable USNORTHCOM, and subordinate commands the opportunity to create discussion for additional cross talk in the Joint, Interagency, Intergovernmental, Multinational (JIIM) environment. Stockpiling supplies in regional warehouses represents FEMA's first step to provide rapid responses to emergencies. However, there are associated factors that make this process cumbersome, which adds enormous supply management strain. Supply life becomes a concern, and FEMA must ensure supplies are within the proper shelf life to avoid causing further harm to the affected populations. The main reason for creating a single logistics infrastructure is to ensure increased capacity among DSCA partners to deliver first class support to Americans in need of emergency support.

USNORTHCOM's standing DSCA Executive Order (EXORD) addresses its organization approach to FEMA's three pillars of responses to catastrophic events. The DSCA EXORD directed that units would submit data through GTN to ensure ITV of personnel, cargo, and equipment.[66] The EXORD portrays how a pure DOD response force provides ITV; however, it does not enhance building partnered capacities with key agencies involved in DSCA operations. The focal point is to create a system that allows data sharing between all levels of government and civilian organizations. This initiative will lead to the development of a common operational picture that facilitates informed decisions designed to save more lives and prevent further

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[65]U.S. Department of the Army, DA G4 ALARACT 255/2007, U.S. Geological Survey (Washington, DC, 2007), 1-2.

[66]U.S. Department of Defense, Defense Support of Civil Authorities EXORD, by CJCS, U.S. Geological Survey (Washington, DC, 2011), 10E.

damage. The crux of the matter concerns the utilization of independent ITV systems that limits collaboration. USNORTHCOM and its subordinate commands find themselves in a quandary because of system incompatibility and levels of authorities. USNORTHCOM's lead role responsibility involves developing acceptable commercial contractual obligations, and establishing the infrastructure to provide efficient logistical support during emergency response operations. If USNORTHCOM simply waits for a call that requires support, the organization will never be in a position to get in the front of this logistical quagmire.

GAO released a report on Homeland Defense in March 2010 that clearly identified gaps in DOD support to DSCA operations. GAO expressed that "DOD makes great effort to communicate with its federal partners through conferences and other forums, but it lacks a single, readily accessible source for its interagency partners to find needed information about its processes."[67] DOD's capabilities include all terrain equipment, trained personnel, and flexible unit response, which position the organization to spearhead all logistical operations within the DSCA JOA. This reality encourages interagency partners to align support mechanisms with DOD, but the lack of a common network forces private companies to establish their own system, which further degrades unity of effort.

Establishing a logistical system for all participants will unify organizational efforts across the spectrum of DSCA operations to achieve greater results while supporting emergency response missions. DSCA operations are primarily logistics based, and modifying the ITV infrastructure will enhance supply tracking, delivery, and accountability. Civil and military leaders must clearly understand the severity associated with emergency response operations, and the impact of

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[67]United States Government Accountability Office, *DOD Needs to Take Actions to Enhance Interagency Coordination for Its Homeland Defense and Civil Support Missions*, U.S. Geological Survey (Washington, DC, 2010), 1-2.

providing quality services to people coping with natural or manmade disasters. Successful ITV operations will provide real time information to leaders across the entire JOA increasing opportunities to make informed decisions. The system must be capable of sharing information across all services, agencies, and commercial entities to facilitate achieving unity of effort.

USNORTHCOM understands the importance of USTRANSCOM. USNORTHCOM's leadership implemented communication initiatives and working groups to ensure increased collaboration occurs to develop an ITV infrastructure that allows DOD, interagency, and commercial organizations the ability to share information. USNORTHOM must continue to identify gaps within ITV, and attack the issue from two avenues of approach. The first approach is to address DOD doctrine and guidance to ensure all services understand the way ahead in regards to achieving synergy within DOD. The second approach must address interagency and commercial partners in a manner that encourages integration to foster enhanced cooperation during emergency response missions.

ARMY IN-TRANSIT VISIBILITY INFRASTRUCTURE

DOD's role as the lead federal agency marks an important function within the DSCA environment in regards to prioritizing and executing Requests For Assistance (RFA). The Global Transportation Network (GTN) represents the ITV nucleus for military operations, and it allows the reception of critical data from the World Wide Port System (WPS) and Global Air Transportation Execution System (GATES).[68] FEMA uses a system called Intelligent Road/Rail Information Server (IRRIS), which allows limited collaboration within the DSCA community. IRRIS technology provides timely and relevant information concerning road conditions, construction, incidents, and weather to facilitate the rapid deployment of assets.[69] Incompatibility represents the primary flaw for each system listed above; however, the ability to provide near real time information is a positive feature that increases the opportunity to improve the current ITV infrastructure.

DOD historically has relied on three ITV systems: Radio Frequency Tags (RF), Automatic Identification Technology (AIT), and Automated Information System (AIS).[70] RF tags allow DOD units to track cargo from point to point based on the location of the interrogator system. This type of technology has served the organization well, but it only captures a particular instance within a certain period detracting from the overarching view of the information system. AIT technology incorporates technology that rivals commercial organizations. The system's

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[68]"United States Transportation Command", USTRANSCOM-Together We Deliver, http://www.transcom.mil/ (accessed December 8, 2012).

[69]U.S. Department of Defense, SDDC, IRRIS Manual Basic Access Version 7.0, by Military Surface Deployment and Distribution Command, U.S. Geological Survey (Washington, DC, 2012), 1-15.

[70]U.S. Transportation Command, (DOD Automatic Identification Technology Implementation Plan for Supply and Distribution Operations. March 2008), Foreword-13.

usage of barcodes and satellites provide DOD units near real time visibility. AIS systems rely on transmitting data to external systems, which military users normally use in the form of Transportation Coordinators Automated Information for Movement System II (TC-AIMS II) and Battle Command Sustainment Support Systems (BCS3) primarily employed in deployed theaters of operations. War fighters are familiar with these two systems, but within the DSCA environment, these systems provide little assistance in providing timely information to enhance emergency operations support based on the architecture of the systems.

The Global Transportation Network (GTN) provides integrated transportation data and the systems necessary to accomplish global transportation planning, command and control, and ITV. GTN is DOD's primary ITV system that collects movement information, integrates information with additional shared systems, and distributes transportation information. GTN provides DOD members tracking ability, cargo and passenger identity, location, planning, and command and control information to combatant commanders.[71] GTN allows collaboration from multiple systems that provides an integrated visibility of supplies moving through the supply pipeline. The Defense Logistics Agency (DLA) provides armed services with food, clothing, textiles, medicines, medical equipment, and construction supplies. DLA performs an integral role during DSCA operations with regard to supplying relief efforts with multiple sources of supplies.[72] JP 3-17, *Air Mobility Operations*, tasks DLA as the executive agent for integrated data environment assets visibility, and it appoints USTRANSCOM as the executive agent for GTN

[71]U.S. Department of Defense, United States Northern Command, In-Transit Visibility (ITV) Concept of Operations (CONOPS), by HQ NORAD-USNORTHCOM J4, U.S. Geological Survey (Washington, DC, 2008), C-5.

[72]"Defense Logistics Agency", America's Combat Logistics Support Agency, http://www.dla.mil/Pages/default.aspx (accessed December 9, 2012).

with the purpose of ensuring the two agencies collaborate to ensure a common logistical operational picture develops.[73]

August 2011 marked the transition of GTN to Integrated Data Environment/Global Transportation Network Convergence (IGC). IGC is a system designed to enhance supply operations between DLA and USTRANSCOM. The idea of the program is to implement current technological advancements to provide greater supply detail and point of reference. IGC creates a single source for DLA and USTRANSCOM to access common movement data, authoritative data, business standards, and information. IGC serves as USTRANSCOM ITV system of record, and IGC synchronizes with other USTRANSCOM Distribution Process Owner (DPO) initiatives, such as Agile Transportation for the 21st Century or AT21. IGC leverages existing systems and Commercial Off-The-Shelf (COTS) technology to eliminate redundancy, to streamline access to data, and optimize resources.[74] IGC provides DOD organizations with a common operational picture and ITV data that allows informed logistical decision making. Providing near real time data to leaders is essential, and this type of data allows commanders to see exactly where their supplies are in a moment's notice. IGC communicates with multiple Army systems and commercial communication systems to develop an improved logistical common operational picture.

USTRANSCOM covers air, land, and sea domains. The Surface Deployment and Distribution Command (SDDC) cover land and port operations. The Military Sealift Command (MSC) executes all oceanic supply movements, and the Air Mobility Command (AMC) executes

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[73]U.S. Department of Defense, *JP 3-17 Air Mobility Operations* (Washington, DC: Government Printing Office. October 2009), I-15.

[74]United States Transportation Command and Defense Logistics Agency, Integrated Data Environment and Global Transportation Network Convergence (IGC), U.S. Geological Survey (As of 2011), S2-S7.

air supply movements. SDDC revealed details concerning an essential partnership established with FEMA to enhance ITV operations. SDDC and FEMA mutually agreed to implement IRRIS to support effective decision making during emergency response and recovery efforts.[75] This partnership marks a distinct transition in the collaboration process between DOD and FEMA. IRRIS modifications ensure FEMA operators can effectively utilize the system during emergency responses.

Commercial partners utilize a variety of systems to track their products across the United States. JP 4-0 advocates, "at the strategic level, joint logistics is characterized by the vast capacity of the nation's industrial base, both governmental and commercial."[76] USTRANSCOM is responsible for providing common user and commercial air, land, and sea transportation, terminal management, and aerial refueling to support the global deployment, employment, sustainment, and redeployment of U.S. forces.[77] However, connecting to the industrial base within the United States is the key to success. Federal Express (FEDEX) and the United Parcel Service (UPS) are the two leading companies in supply deliveries within the United States. The headquarters of FEDEX is located in Memphis, Tennessee, and the company employs over 300,000 people worldwide.[78] UPS world headquarters is located in Atlanta, Georgia, and employs over 398,000

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[75]United States Transportation Command, Surface Deployment and Distribution Command, SDDC Partners With, Provides IRRIS Technology to FEMA, by HQ SDDC, Command Affairs Office, U.S. Geological Survey (Scott AFB, IL, 2007).

[76]U.S. Department of Defense, *JP 4-0 Joint Logistics* (Washington, DC: Government Printing Office. June 2008), VIII.

[77]Ibid., VIII-IX.

[78]"Federal Express, Fastest Nation Wide", http://www.fedex.com/ (accessed December 9, 2012).

people worldwide.[79] The companies' ITV goals are to offer near real time data, which is accessible through mobile, computer, and telephonic means.

Fred Smith, who founded the Federal Express Corporation in 1971, reasoned, "the information about the package is just as important as the package itself."[80] FEDEX owns and employs technology called SenseAware, which provides customers with near real time package visibility. SenseAware provides enhanced visibility during shipping, allowing customers to take control of your supply chain. SenseAware helps customers heighten security, improve efficiency, and productivity, and gain confidence from business partners and clients.[81] Essentially this technology provides the functions of RFID tags employed by DOD. The key difference between a RFID tag and SenseAware is the delivery of communication. SenseAware provides continuous tracking information; RFID tags must pass fixed external readers along interstate highways to capture signals resulting in tracking interruptions. The device is battery operated and once the batteries reach low levels, the devise becomes ineffective. SenseAware provides near real time visibility, is easily accessible by means of web based platforms, and it provides the customer a critical advantage to mange shipments by accessing the SenseAware device.[82] This device represents the next step in providing the appropriate data to leaders in the DSCA environment to make informed decisions.

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[79]"United Parcel Service, We Love Logistics", http://www.ups.com/ (accessed December 9, 2012).

[80]"Federal Express, Fastest Nation Wide", http://www.fedex.com/ (accessed December 9, 2012).

[81]"SenseAware", http://www.senseaware.com/ (accessed December 9, 2012).

[82]Ibid., 1.

The United Parcel Service employs a system titled Trackpad that incorporates a tracking structure designed for managers, users, and administrators. UPS describes Trackpad as, "a productivity tool that will enhance your organizations tracking operations.
UPS's Trackpad uses state of the art technology to track packages through your company, recording when a package is received, when it is delivered, and who signed for it."[83] Businesses can download the software to their systems to enhance point-to-point visibility. Trackpad advantages include the ability to customize tracking needs, easy installation, and enhanced package visibility during transport. The capability to provide near real time visibility that facilitates informed decision making, represent the difference between FEDEX's SenseAware System and UPS's Trackpad system. Disaster operations in the DSCA environment requires accurate, timely, and predictive analysis to ensure the correct supplies reach the people in need.

[83]"UPS Trackpad 4.0 User Guide" (Atlanta: United Parcel Service, 2005), 8, http://www.ups.com/content/us/en/bussol/browse/trackpad.html (accessed December 9, 2012), 8.

CONCLUSION

The creation of a single ITV infrastructure would enhance DSCA operations between federal, state, local, and commercial partners during emergency responses. The preponderance of forces, capabilities, and resources logically establishes DOD as the most capable organization to direct logistics distribution efforts to increase efficiency during DSCA operations. Creating a DOD ITV battalion under the leadership of the Combined Arms Center (CAC) will resolve the current logistical inadequacies in the DSCA environment.

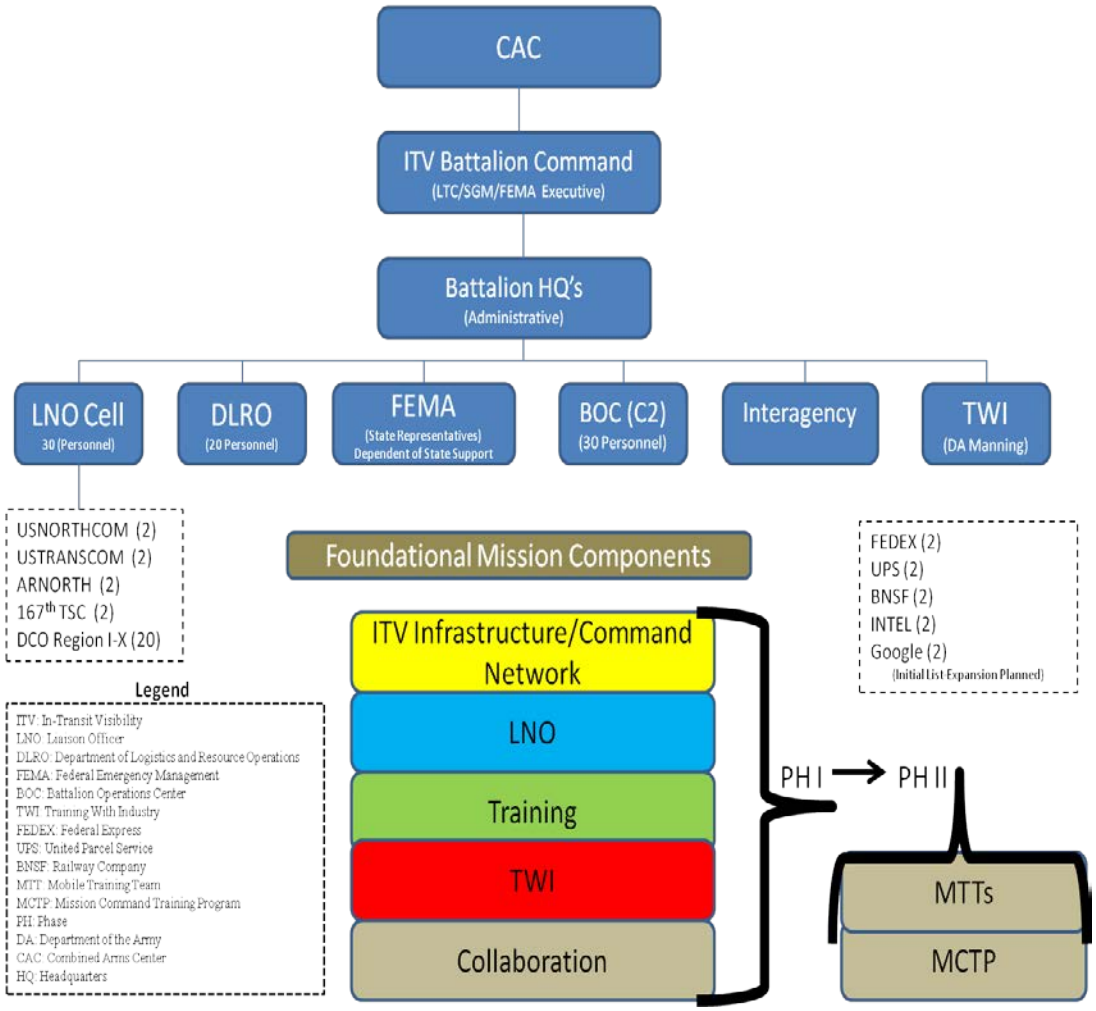

Figure 2: In-Transit Visibility Battalion Organizational Structure

Source: The Author

The primary mission of the ITV battalion requires the establishment of a single source national ITV infrastructure that allows data sharing between federal, state, local, and commercial organizations. Organizations across the DSCA environment employ a diversity of information systems that eliminates the opportunity to create a shared operational focus. This organizational behavior creates myopic mission execution templates that detract from DSCA operations holistically.

ADP 3-0 identifies operational art as "the pursuit of strategic objectives, in whole or part, through the arrangement of tactical actions in time, space, and purpose." [84] DOD's task to serve as the lead federal agency mandates that Geographic Combatant Commanders effectively employ operational art in an effort to achieve desired DSCA end states. Establishing a single source ITV infrastructure that presents one common understanding and framework allows commanders to make informed decisions without compromising the mission based on the lack of a comprehensive information environment. This system will allow a holistic command approach, and synergy gained from a joint interagency ITV infrastructure will produce enormous gains during DSCA operations.

Fort Leavenworth, Kansas, provides the optimal central location for the establishment of an ITV battalion. Fort Leavenworth's close proximity to USNORTHCOM, DOD's lead federal emergency response agency, USTRANSCOM, DOD's distribution pipeline owner, and a large commercial airport allows rapid deployment and cargo movement to any location within the United States. The second reason is the co-location of the Command and General Staff College (CGSC), which allows CGSC to teach, train, and certify officers through designed curriculum prior to graduation. The only fault in this system is the absence of commercial representation, and

[84]U.S. Department of the Army, *ADP 3-0 Unified Land Operations* (Washington, DC: Government Printing Office. October 2011), 9.

expanding TWI roles and responsibilities will solve this issue. Distant objectives of the battalion would involve improving the JIIM environment by ten percent each year over a ten-year period. At the conclusion of the ten-year period, the entire DSCA community's ability to operate the identified single source ITV system will revolutionize decision making during emergency operations. The recommended establishment of the ITV battalion will occur in two phases. Phase one will encompass the establishment of the most critical missions to make the battalion functional to support DSCA operations within a hundred and eighty days. The second phase will involve establishing two additional missions that will provide training, education, and supply visibility to all participants within the DSCA environment.

Phase one involves establishing the ITV battalion's five foundational missions which will ensure ITV operations meet the current needs of leaders, emergency responders, and people in need of emergency assistance. The first mission is to establish and maintain an integrated ITV infrastructure and command network. The commander of the ITV battalion should be a Lieutenant Colonel (LTC) with a Sergeant Major (SGM) to assist in the overall execution. The number of soldiers within the battalion should range from 100-150, and the total number will depend on interagency commitment. The commander must establish a battalion operations cell (BOC) to gather, filter, analyze, and disseminate information within the DSCA environment. As stated earlier, the intent of the monograph is not to suggest an information system but to establish an infrastructure that will modify ITV operations to enhance the response network.

The second mission of the ITV battalion entails providing a minimum of two liaison officers (LNO) to each of the following organizations: USNORTHCOM, USTRANSCOM, ARNORTH, 167th Theater Sustainment Command (TSC), and the ten FEMA Regions. This mission is extremely important to achieving organizational success. Liaison officers must establish and maintain positive habitual relationship built upon trust to facilitate information exchange to develop a single operational framework. The liaison officers' rank should be captain

or sergeant first class at a minimum, and establishing a minimum rank structure highlights the importance of individuals experience, skill, and ability to affect a national program in a positive manner.

The third mission requires the ITV battalion to establish a permanent training department under CGSC's Department of Logistics and Resource Operations (DLRO) to train and educate officers, interagency students, and provide a Mobile Training Team (MTT) to key Noncommissioned Officer (NCO) schools as prescribed by the established curriculum in the Intermediate Level Education (ILE) program. This mission will speed the ITV inculcation process throughout the DSCA environment to yield greater response efforts. CGSC students' exposure to ITV operations will enhance their ability to affect gaining organizations operations upon graduation, and it allows officers the ability to drive operations through the current mission command philosophy. CGSC represents all the key members of DSCA execution, and the key aspect involves students' shared experience, which will carry over into the actual working environment.

The fourth mission would be to ensure collaboration occurs at the federal, state, local, and commercial levels. Assigning a LTC and SGM as the battalion's leadership facilitates delivery and exchange of information. The battalion must ensure DOD, FEMA, state emergency leaders, and commercial organizations are engaged in effective communication designed to accomplish the end state of providing a comprehensive single ITV source for all participants within the DSCA environment. The ITV battalion must establish a permanent joint operations cell capable of providing continuous coverage, which represents the first objective towards achieving collaboration within the DSCA environment. The entire concept of creating an ITV battalion depends on complete collaboration between all levels, and the lack of collaboration will render the battalion ineffective and place effective emergency response efforts at risk.

The final mission in phase one is to gain operational control of officers and noncommissioned officers serving with the TWI program. TWI soldiers represent the link between commercial and government interface that allows closed loop ITV reporting. The TWI program represents a vital link between the American economy and Army leaders. Expanding officers and NCO roles during their TWI assignment will allow DOD the opportunity to enhance the ability to track the movement of supplies to critical emergency response efforts. FEDEX is one of the key commercial organizations within TWI, and allowing the officer to provide real time information will provide an enormous upside to DSCA operations. TWI provides a link to strategic logistical partners, and their collaboration will ensure leaders have a comprehensive data framework to make informed decisions during DSCA missions.

Phase two involves establishing a section designed to collaborate with Mission Command Training Program (MCTP), and creating a Mobile Training Team (MTT) to educate noncommissioned officers at their learning institutions and units requesting additional training support. MCTP trains echelons above brigades and tapping into their training cycle will allow ITV operations to permeate throughout DOD. The ITV MCTP section will remain under the operational control of the ITV battalion commander, but training guidance and control remains under the purview of the MCTP organization. This will allow ITV trainers to see the system in use to provide horizontal and vertical feedback to improve the overall effectiveness of the network. The final mission involves establishing MTTs to travel throughout federal, local, state, and commercial levels to provide ITV training and education combined with emerging operating procedures.

Effective ITV operations are paramount to supporting DSCA operations. ITV operations provide Army logistics officers, FEMA leaders, interagency representatives, and commercial partners the opportunity to make informed emergency response decisions in an effort to save lives. Forecasting the arrival of supplies allow leaders to establish a complete supply ITV

logistical picture that facilitates unity of effort within the JOA. ITV represents a vital link between certainty and uncertainty. The ability to track items provides predictability in emergency response preparedness, equipment readiness, sustaining lives, and overall accomplishment of the strategic goals established by the Department of Homeland Security.

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